

# **EXPORTATION**

OF THE

## **CARLSBAD MINERAL-WATERS,**

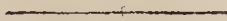
THEIR EFFECTS UPON THE HUMAN FRAME, THEIR APPLICATION AND  
MANNER OF USE.



BY

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An experience of several years — from March 1843 till the end of 1846 — having fully proved to the writer of these pages the great importance of the exportation of the Carlsbad waters, it seems to him to be high time to instruct the public in general upon the immense advantages accruing from the exportation, as well as upon the effects of the exported waters, and their manner of use; and the author in engaging in this little labour, has done so impressed with the sincere conviction of being able thereby to contribute somewhat towards the welfare of suffering humanity. While, however, he has endeavoured to render these remarks as familiar and intelligible as possible, it will nevertheless be necessary, even for the educated but unprofessional reader of them, to have recourse to the interpreting aid of some medical friend; a circumstance which the author neither desired to dispense with, nor indeed, consistently with his principles, was it permitted him to do so; because however great a friend he himself is for rendering popular the scientific matter belonging to this subject, yet he will never entirely sacrifice thereto the scientific form, inasmuch as the danger thus incurred would far outbalance the advantages that might be gained.

Since the time that Carlsbad's waters had become famed throughout the civilised world during a long series of centuries, and had enjoyed the well-merited celebrity of producing cures, often as if by a miracle, in many maladies of the most obdurate character, and which had already previously baffled every other remedy tried; the circumstance that their use as a means of cure was limited to the spot where these inimitable fountains issue forth from the earth, must have rendered the involuntary renunciation of them so much the more painfully felt; and yet how many have been subjected annually to this melancholy privation, how many thousands have been compelled to resign this their last hope based on the healthdispensing waters of Carlsbad!

Already at former periods the Carlsbad waters had been sent from time to time with permission of the imperial government to



persons of distinguished rank residing in distant countries, and employed by them with beneficial results, but it was not until the year 1843 that the exportation became free for every individual and to every land, at first indeed only from the Castle-spring (Schlossbrunn), but in 1844 from all the Carlsbad sources. How important the exportation has become in these four years appears by a comparison of the exportation-table of 1844 with that of 1846:

	1844	—	1846:
to Brunswick....	250		1000
Berlin.....	2500		12000
Lübeck.....	300		1500
Magdeburgh..	100		1500
Moscow.....	—		800
Prague.....	18000		30000
Presburgh....	—		600
Warsaw.....	1500		6000
	<hr/> 22650		<hr/> 53400.

The cause why the sale of the Carlsbad thermal springs has so rapidly acquired importance, and in a short time must attain an extent almost incredible, lies in the impossibility of producing a substitute for them in the treatment of a vast number of chronic diseases, which these mineral waters have the power of healing by virtue of their peculiar chemical composition and of their temperature; hence also it has arisen, that since the time when Struwe — the first and most distinguished preparer — introduced the process of compounding artificial mineral waters, so enormous a quantity of artificially imitated Carlsbad waters has been consumed in the different mineral-water establishments in Berlin, Dresden, Leipsic, etc. as may be seen in Vetter's *Annals of Mineral-spring Establishments*; nay the demand for artificially prepared Carlsbad waters has ever been the greatest and most constant, nor have the patients, who employed them, had to complain of the absence of favourable results. Although it was thus a matter of necessity for many, whom circumstances (of what kind soever they might be) did not permit to visit Carlsbad themselves, to endeavour to seek a substitute for its springs by chemical imitation, in order that they might employ the same at home; nevertheless such artificially prepared waters formed of course merely an approximation to the Carlsbad thermal springs; consequently it must be regarded as a valuable benefit that a just appreciation of their inestimable properties has at length prevailed over ancient prejudices and ill-understood and erroneously pursued private in-

terests, while by the exportation of the Carlsbads springs the medical treasures of every civilised land have been enriched with a remedy not unfrequently miraculous in its effects.

Out of these considerations, however, arise the following questions, viz: can the Carlsbad thermal waters be transported without deterioration of their efficaciousness? does a mineral spring warm by nature undergo any alteration prejudicial to its healing properties through cooling and re-warming?

Now although these questions might doubtless be considered superfluous, being already in point of fact answered, inasmuch as the natural waters, when carefully bottled and effectually preserved for the purpose of transport, do and ever must maintain an incontestible preference over the artificial, nevertheless the author will here prove from a chymical point of view the invalidity of the doubts implied in them.

As is well known these questions have never been raised with regard to cold mineral springs; on the other hand, however, they have been entertained with so much the more force as respects the hottest springs, for it has been considered, partly that the heat escapes much more slowly from these than is the case when they are artificially heated, partly that the chymical elements are held in a state of more complete solution, while moreover in their formation mysterious volcanic and electric forces are imagined tho have been engaged in inexplicable activity.

Numerous experiments, however, made by some of the greatest investigators of nature have proved incontrovertibly, that common spring-or distilled water cools, under similar external circumstances, in precisely the same time as mineral water of the same heat, and which has just issued from the interior of the earth.

There can be no doubt therefore that Carlsbad waters, filled according to the admirable manipulation-system of Hecht, and transported in well-closed stone bottles, are quite as applicable for medical use as every other mineral water; that they lose none of their chymical elements, while their heat can again be restored to them. The decomposition too of the water, which is feared by many, is only possible when the filling of the bottles and their preservation have been negligently executed, and even then not till after a long period, and it is discoverable upon pouring out the first glass.

Experience has pronounced in favour of all the Carlsbad springs, which transported to the most distant countries, have arrived in them in a perfect state, and (as, e. g. in Greece) after being kept many years, were found to be as completely unchanged as on the first day of their filling.



Let us inquire, however, what there is in the Carlsbad mineral waters subject to decomposition in consequence of their chymical elements. As the best answer to and elucidation of this question, we give here the chymical analysis of some of the most important of the Carlsbad springs.

16 ounces of water contain of solid parts in grains.	Berzelius: in the Sprudel	Steinmann: in the Schlossbr.	Wolff: in the Marktbr.	Russian Crown in 100 parts.	
Sulfate of potash.	—	3,03252	1,96039	0,11191	chloride of potash
— soda . . .	19,86916	15,37989	17,99193	1,49163	
Phosphate of . . .	—	—	0,01005	0,06587	
Chloride of . . .	7,97583	7,52640	8,32988	0,68369	
Jodide of . . .	—	—	0,02096	0,00120	
Bromide of . . .	—	—	0,01336	minute quantity	
Silicic fluoride . . .	—	—	1,32287		
Carbonate of . . .	9,69500	8,85340	9,45538	0,74797	
— — lithion . . .	—	0,01605	0,01927	0,00214	
— — strontian . . .	0,00737	0,00330	0,03778	0,00052	
— — lime . . .	2,37005	2,39846	2,14189	0,33315	
— — magnesia . . .	1,36965	1,17704	1,89871	0,13743	
Protoxyd of iron . . .	0,02780	0,02342	0,18908	0,00251	
Oxyd of manganese . . .	0,00645	0,00492	0,01858	0,00084	
Phosphate of lime . . .	0,00169	0,00607	—	0,00080	
Bas. Phosphate of alumina . . . . .	0,00246	0,00653	—	0,00094	
Alum. contain. ox. of iron . . .	—	—	9,02519	—	
Fluorate of lime . . .	0,02458	0,01521	—	0,00185	
Silica . . . . .	0,57715	0,44867	1,32710	0,05336	
Loss . . . . .	—	—	0,07198	0,00558	
Total . . . . .	41,92719	38,89190	43,88870		
Carbonic acid gas . . .	3,30593	8,02782	5,21717	0,14880	
Nitrogen . . . . .	0,00860	0,01859	0,01498	0,00167	

What now can the Carlsbad waters when carefully filled lose of their healing elements? At most a minute portion of carbonic acid and nitrogen, the other component parts remain unchanged; for it is also proved by the experiments made, that Carlsbad waters exported and artificially heated, yield upon chymical analysis the same elements and these too in equal masses (excepting the gaseous) as at their source. But even the

senses without the aid of any chymical examination admit the same indubitable conclusion, inasmuch as the non-alteration of the physical qualities (translucency, colour, taste, etc.) affords the most infallible testimony of homogeneous chymical contents and in fact also the exported Carlsbad waters have admirably stood this test so easily made by every even unprofessional judge. Should however the doubts of overanxious persons not even yet be removed in spite of all these reasons; still medical experience must be admitted as irrefragable evidence; and this experience, which has pronounced unreservedly and absolutely for the wonderful healing virtues of the exported Carlsbad thermal waters, is not indeed the questionable voice of some, few physicians influenced it may be by interested motives; but the result of countless experiments confirmed by an entire public of private physicians, as well as by the medical heads and inspectors of large public hospitals and infirmaries for the sick. Where however theoretical grounds and the experience of so many competent judges rise victorious above former prejudices; there can no longer any doubt remain even with the unprofessional public, that the Carlsbad mineral waters can be transported, just the same as those of Marienbad, Ragozy, etc. or even as the bitter waters of Saldschütz and Püllna. Remarkable however in the opinion still adhered to by many, that those springs which are of a lower temperature are transportable and not liable to decomposition, but that this is not the case with the Sprudel, Neubrunn, Marktbrunn, etc.; as if this warmth of the Carlsbad waters, which does not reach the boiling heat by many degrees. were not an inconsiderable and consequently upon the chymical elements uninfluential portion of that heat which is no longer measurable by any thermometer; whereby a change of the chymical state could first take place through evaporation or in any other manner! Although now experience founded on facts proves, that the exported Carlsbad Sprudel becomes again the very same hot Sprudel spring, when it is warmed to  $59^{\circ}$  R. ( $165^{\circ}$  Fahrenheit) nevertheless the above-mentioned prejudice is not yet so completely eradicated, to allow of its being here passed over in silence, the less so as there have been physicians even in the most recent times, who have not doubted the transportability of the Schlossbrunn, having a warmth of  $37^{\circ}$  R. ( $115^{\circ}$  F.) and yet have questioned that of the Sprudel of  $59^{\circ}$  R. ( $165^{\circ}$  F.). Now as the cold mineral springs have a temperature of  $8^{\circ}$  to  $12^{\circ}$  R. ( $50^{\circ}$  to  $59^{\circ}$  F.) so there exists consequently a difference of  $25^{\circ}$  to  $29^{\circ}$  ( $56^{\circ}$  to  $65^{\circ}$  F.) between them and the Schlossbrunn; while between the Schlossbrunn and the Sprudel there is a difference of only



22° (49° F.); thus this supposition reduces itself to a gross contradiction, which finds in the former greater difference no cause sufficient to produce chymical decomposition, but maintains that the latter and lesser difference is threatened therewith. It will require some years of practical experience in order at length to dispel this error also, which is based upon nothing whatever else than the old spirit of mysticism.

If we now turn our attention to the influence of the Carlsbad thermal springs upon the human organism, we find it to result chiefly from their chymical elements, the mutual relations of these to one another, and from their high temperature. Want of space forbids us here to enter into details; those however who would wish to be more minutely instructed in the effects and in the manner of operation of the Carlsbad waters, we refer to Hlawaczek's, Wagner's, and other works, or to Loeschner's treatise entitled, „Healing effects of the Carlsbad Waters“ in the Prague Quarterly Journal of Practical Medicine (XIV vol.) in which treatise they are explained in the clearest and most circumstantial manner possible according to the present advanced state of medicine.

The following explanation may here be sufficient. The Carlsbad thermal springs produce their effects neither by primary and special operation alone upon the ganglionic nervous system, nor by an exclusive influence upon the system of the blood-vessels, but the seat of their operation is — assimilation; and this is rendered so powerful especially by the very high temperature of the springs, which alone makes it comprehensible, why the chymical elements of these waters produce a so searching and permanent effect. The several Carlsbad springs contain, in every 16 ounces, from 39 to 44 grains of solid parts, at a temperature varying from 33° to 59° R. (105° to 165° F.); we will therefore take the Sprudel as the type of all the springs of Carlsbad, and as determining for us the proportions of the rest. In 16 oz. or 1 lb. of water of this spring are found nearly 20 grains of sulfate of soda, 10 grs. of carbonate of soda, 8 grs. of muriate of soda, more than 2 grs. of carbonate of lime, 1 gr. of carbonate of magnesia, and a small quantity of protoxyd of iron, besides minute portions of phosphates, iodine and brome, a moderate quantity (above 3 grs) of carbonic acid, and somewhat nitrogen, at a temperature of 59° R. (165° F.). Now if we estimate every 3 glasses, such as are usually drunk, ad 1 lb. of water, and the usual number of glasses drunk at 12, consequently altogether 4 lbs. of water; then the patient takes within about two hours and a half, for a period of 24 hours, in solid and volatile parts of the Carlsbad Sprudel spring, 80



grs. of sulphate of soda; 40 grs. of carbonate of soda, 32 grs. of muriate of soda, 8 grs. of carbonate of lime, 4 grs. of carbonate of magnesia, 14 grs. of the above-mentioned salts, together with protoxide of iron, iodine and brome, 13 grs. of carbonic acid with portions of nitrogen, and all this in solution in hot water, whose temperature however as regards the palate still just admits of its being sipped: the whole therefore constituting a quantity of nearly 200 grs. of by no means unimportant medicamental elements.

If now we make the experiment, as I have repeatedly done to dissolve in hot water the more important of the above-named salts, and tho drink them taking at the same time gentle exercise and observing a suitable diet, we obtain already results similar to those which Carlsbad affords us, and indeed the employment of the artificial Carlsbad waters corroborate this in a more striking manner, inasmuch as all accounts agree in stating that the effect is less in degree only, which moreover is occasioned not indeed alone by the deficiency of the component parts, but at the same time by the generally less advantageous external circumstances. It would lead us too far to state the effects separately of each individual chemical element of the Carlsbad mineral waters, and from the combined examination of all to proceed to judge of the entire effect, the statement and manifestation of the latter will therefore suffice here.

By virtue of the considerable quantity of sulphate-and muriate of soda in combination with the minuter portion of phosphates, the Carlsbad waters work especially with searching and dissolving effect upon the mucous membrane of the intestines, incite it to more vigorous secretion, not only digesting the secreted matter, but also at the same time imparting, to it, as it were, the character of both salts, while the carbonate of soda with the carbonate of lime and the magnesia disoxydating the secretion, fixing the acids, and again setting them free, both at the same time in combination with the carbonate cause besides the taking up of the iron, iodine, and brome into the intestinal fluids; the whole process is meanwhile lightened and increased in efficaciousness by the high temperature, a rapid and searching augmentation of the organic activity of the mucous membrane is produced, accompanied by an equally quick alteration and transmutation of the fluids, and lastly the imbibing of the altered fluids is increased and accelerated. It is obvious that by virtue of the quick change of matter brought about in this way, and of the accelerated circulation of the blood in the abdomen, as well from the increased motion of the intestines as from the high temperature of the mineral water, a more perfect prepa-

ration of the blood, and a more vigorous secretion from it are induced. By the energetic impulse given to the mucous membrane, and its increased activity in all directions, firstly all foreign matter is removed from it, and then by the effect of direct action upon the whole surface of the intestine an increased secretion and resorption are produced.

The function of the intestinal glands is regulated, a nutritive matter mingled with the medicinal elements of the Carlsbad water is imbibed and conveyed to the blood. Now we know by experience that sulfate of soda combined with carbonate of soda contributes powerfully to decarbonise the venous blood, accelerate the functions of the liver, and improve the secretion of the bile. How much more powerfully must this take place by the employment of the Carlsbad springs, how much these waters, — in which, besides a considerable quantity of the sulphate and carbonate of soda, muriate of soda is found united with the carbonates of magnesia and lime, which contains also oxide of iron, iodine, brome, and a portion of free carbonic acid at a warmth of  $59^{\circ}$  R. ( $165^{\circ}$  F.) — must contribute to the transmutation of the whole mass of blood, to the entire process of nutrition and assimilation? Upon the circulation of the blood in the abdominal organs, as already explained, especially in the venous system (vena portae) it operates accelerating and vivifying, increasing the secretion and excretion of the intestinal canal; it works so much the more vigorously upon the functions of the venous system, the functions of the liver and spleen, the functions of all the glandular organs, produces its greatest effect by the transmutation into a normal state of the venous blood before hypercarbonised and overloaded with heterogeneous matters. Hence the Carlsbad waters operate so powerfully, and often produce almost incredible crises, through the intestinal canal, the kidneys, the external skin, and the mucous membrane, not however before the effect has attained its greatest height. For this reason Carlsbad cures so many diseases from simple liver-complaints, up to gout and stone, chronic exanthemata and disorders of the nerves; then only however when they originally belong to that diseased state of the venous blood, etc. of which here merely a few outlines have been given. From what has been said above it appears evident, that Carlsbad is especially salutary in those maladies, whose organic seat is to be sought in abnormalities of the digestion, in the organs being overcharged with hypercarbonised venous blood, particularly the liver, the spleen, and the whole venous system, in the stagnation thereby produced in them, and in the insufficient or entirely failing removal from them of inimical matter.



Carlsbad waters constitute thus most particularly a remedy hitherto unequalled for disorders of the venous system, and for all secondary and tertiary states arising out of them. With right therefore has the doctrine at all times been maintained that: the thermal springs of Carlsbad are in the highest degree solvent, peculiarly transmuting the entire mass of fluids, powerfully promoting the secretions of the intestinal canal, of the liver, kidneys and of the skin, without inducing any notable enervation; but that they are especially distinguished as inciting remarkable crises, and producing beneficial and long-enduring after-effects.

The maladies for which Carlsbad waters are particularly recommended may be very properly ranged under four classes:

1st class: Diseases of digestion and assimilation as first links of that long chain of sufferings, which are gradually developed upon this soil and ground, and which are induced principally by a sedentary life, unsuitable diet, suppression of the intestinal evacuation, close and corrupt atmosphere, distressing agitations of the mind, etc. Excess of acidity in the intestinal fluids, immoderate secretion of mucus, heartburn, costiveness, flatulence, cardialgy, colic, chronic vomiting, lowness of spirits induced thereby, increased irritability, hypochondriacal and hysterical affections. 2nd class: Disorders of the liver, spleen, abdominal glands, mesenteric glands, kidneys, and sexual organs, organs of respiration, arising from the venous blood being overcharged with primarily or secondarily generated hypercarbonisation, stasis, hyperaemy, polycholy, indurescence, hypertrophy, and organic changes of the tissue, fat-liver, nutmeg-liver, granulated liver, jaundice, gallstones, enlargement of the spleen, melanosis, abdominal scrofula, stones in the kidneys, hypertrophy of the ovaries, pseudoplasma of the ovaries; physconia of the uterus, fluôr albus, polyblennia of the organs of respiration, oedem of the lungs. 3rd class: Disorders arising from either of the two first classes: haemorrhoids, gout, lithiasis, diabetes, dropsy, tetters, periodical chronic erisipelas, lichen, prurigo, plica Polonica, obesity, cataract and chronic inflammations of the eyes, glaucoma, chronic inflammation of the organ of hearing. 4th class: Diseases of the nervous system, hysteria, hypochondria, tic douloureux, ischias, asthma, palsy, convulsions, hardness of hearing, and mental derangement.

In the use of the springs in these maladies very much depends upon the indication for their application as well as upon the individuality of the patient. If the effect of the springs must be gradually and slowly solvent, and produce a change in the fluids, then it is best to begin with minute portions, and to increase them by degrees. Has the patient a predisposition

to congestion towards the head, or to the organs of the breast or is he already advanced in years, then must the greatest caution be employed, in order that no prejudicial after-effect may ensue, especially from a too rapid cure; nay in such cases it may be necessary at first to order the waters to be drunk cool; so likewise in cases of excessive excitability and of one-sided head-ache; with individuals in whom the hot water occasions nausea, vomiting, or an insurmountable loathing: by obstinate suppression of the stool, in which latter case not unfrequently the cooled Sprudel water combined with Sprudel salts renders much more effectual service. Is it desirable however to produce a powerful effect in individuals of a torpid, or phlegmatic constitution or disposed to corpulence, then a rapid and vigorous process cannot fail to be advantageous. At first generally 4 to 6 glasses are sufficient (1  $\frac{1}{2}$  lb. to 2 lbs.), but after some days' use the number may be increased to 10 or 12 glasses (3 lbs. to 4 lbs.) Although of course every one, who can possibly do so, as well hereafter as hitherto, will certainly have the Hygeian beverage dispensed to him, by the beneficent Naiads of Carlsbad, fresh from its native source rather than at a distance from it set free the hermetically enclosed and imprisoned Spirit of the spring; nevertheless the exported waters are also much to be recommended to the regular visitors of Carlsbad, and this 1ly: as preparatory cure, which is of incalculable advantage, as the organism thereby comes to the spot itself far more susceptible for the effects of Carlsbad's springs, and receives them with far better results. 2ly: as after-cure either when the time employed upon the cure itself in Carlsbad has been insufficient. or a repetition of the cure becomes necessary after a pause of some weeks, or a continuous succour in the intestinal functions proves to be requisite. It may be employed for special cures either when the malady or circumstances admit not of a journey to the springs themselves. Moreover time of year or weather opposes no impediment to the use of the exported Carlsbad waters, if only caution be employed, and they may be drunk warmed or cold according to the decision of the medical adviser, (in the former case with more rapid results) in both cases with or without Sprudel salts, and with strict observance of the diet regulations which are given immediately below. The warming is best made by placing the still-corked bottles from 10 to 15 minutes in a vessel filled with boiling-hot water, and proceeding in the same manner during the period of drinking. The filling is conducted with the greatest caution under strict medical superintendence, an accurate designation of the springs being made upon the bottles. In regard to the regimen



that must be observed during the use of the exported Carlsbad waters; 1ly: A rigid moderation in all the enjoyments of life is above all things to be urgently recommended as an indispensable condition of cure. 2ly: The avoiding as far as possible of all violent but most especially of all depressing emotions of the mind. 3ly: Much exercise on foot and in the open air is advisable, but never continued so as to fatigue, or heath the body, or to the breaking out of perspiration. 4ly: The mineral-waters must be properly digested and assimilated to the body; for this purpose besides the 3 preceding conditions a conformable manner of living as respects food and drink is likewise most especially necessary. The breakfast must not be taken until 1 hour or  $1\frac{1}{2}$  hour after the drinking of the waters, and may consist of gruel, barley-water, beef-tea, weak coffee with milk, or black tea with milk and white bread; the dinner may be composed of a variety of viands, meat-broth, boiled or roast meats, vegetables, light puddings, or stewed fruits, but all dishes of such a nature as generate flatulence must be strictly avoided. Fatty, oily, sour, smoke-dried, salted, corned, and half-putrid viands, as for instance high venison or old cheese, must be rigidly rejected, likewise raw fruits, as well as pastry and cakes in general: the early evening-repast may consist in due proportions of soup, light meats or stewed fruits with wheaten bread; for drink spring watter, also a little wine or good beer, but these latter never without the special permission of the medical adviser. Moreover in drinking the exported mineral waters all the same dietetic rules must be observed as when they are drunk at the sources themselves. The waters must if possible be taken early in the morning while walking in the open air in a pleasant country and in lively companionship. During the promenade a glassful of 4 to 6 ounces is drunk every 10 or 15 minutes, either with or without Sprudel salts according to the directions of the physician. The number of glasses may be at first for adults 4 to 6, for children 1 to 2. The number may be gradually increased from 8 or 10 to 12, and the duration of the time for drinking proportionally lengthened according to the judgment of the medical adviser, whose counsels during the drinking of the waters must never be neglected in so far as the patient sincerely regards his own welfare. The waters may be drunk in the evening, between 5 and 7 o'clock, if the physician should declare it necessary; but cool, and after an early dinner. The usual period for a course of drinking the waters is from 4 to 6 weeks, and sometimes a repetition of the course is necessary after a pause of several weeks. On windy and rainy days, in late autumn, winter or spring, the waters must be drunk at

home, and then exercise must be taken during an hour at least if possible in the open air or in a covered airi corridor. Let it not be erroneously imagined that the expectation of a perfect cure must give place to a painful renunciation of hope, if a favourable effect does not immediately manifest itself after the therm of drinking the waters is expired, since such a successful result does not always follow at once. The cure which often developes itself gradually even months after the drinking of the waters, but then not rarely in full measure, may by such untimely hopelessness, operating depressingly on the spirits, be delayed, or indeed totally impeded, The protraction of the after-effects is thus naturally explained, that the functions of the intestinal organs are regulated by degrees, and a new vivifying of the sluggish vital powers must precede the often necessary transmutation of the blood and fluid-mass.

May the favourable reception given to that contribution to the science of medicinal springs be also extended to these few unpretending pages, in which, as already mentioned in the beginning, the author has had chiefly in view the benefit of the great body of the public, and the desire to do somewhat for the promotion of the common weal.







